KEVIN HORN
Senior Manager
AECOM Consulting Transportation Group

Dr. Kevin Horn, Senior Manager is responsible for the freight, intermodal, and logistics practice of the firm. Dr. Horn has more than 25 years of experience in transportation and logistics economics and financial analysis, with a particular focus on freight and intermodal operations related to ports and railroads. Before joining AECOM Consulting Dr. Horn was a Research Professor with the National Ports and Waterways Institute and Senior Intermodal Analyst with Louis Berger Group. His past experience includes port and intermodal transport capacity and investment simulation studies, benefit cost analysis of river and harbor navigation improvements, vessel fleet cost analysis and size projections, and port and marine terminal privatization. He has rail freight operations, trucking and warehousing experience in conjunction with logistics and distribution planning.

Representative Accomplishments

Dr. Horn has managed a wide range of consulting assignments, including:

- **Cost-Benefit Analyses.** Extensive experience related to highway and waterway improvements and freight logistics.
- **Financial Analysis.** Extensive experience linking cargo volumes with tariffs and operating expenses, particularly for ports to develop simulations of financial impacts resulting from changes to cargo volumes, vessel fleet characteristics or tariff levels. An integrated approach to cargo and vessel throughput in conjunction with tariff elements has been successfully used in port investment and privatization studies.
- **Logistics and Transport Operations.** Based on a background in transport and logistics production operations has unique capabilities to develop and assess the financial and economic performance as well as capacity of alternative operations, investments, and institutional constraints.
- **Commodity Projections and Vessel Fleet Forecasts.** Substantial experience with real world commodity flows and related databases with regard to transport requirements such as seasonality, handling, and storage. Expert analysis of modal applications with regard to capital and operating costs and trends in capacity.
- **Capacity Utilization Assessments.** Experienced integrating real world transport operations into practical modeling frameworks that can be used to define alternative scenarios for cost, capacity, transit time, and investment requirements. Port capacity throughput models have stressed interrelationships between berth, yard, and gate operations based on actual vessels and cargo flows rather than industry norms and standards for isolated components. Freight sector cost models have stressed non-linehaul components and equipment utilization cycles.

Dr. Horn has directed engagements for a broad range of public and private sector domestic and overseas transportation organizations. His clients have included:

Ports

- Maryland Port Administration
- Alabama State Docks (Port of Mobile)
- Sociedad of Portuaria Regional de Cartagena
- Archangel, CIS
- Port Authority of New York and New Jersey-Port Department
- Port of Baton Rouge
- Cicading, Indonesia
- Karachi Port Trust

U.S. Army Corps of Engineers Divisions and Districts (Harbor and River Improvements)

- Institute for Water Resources
- Philadelphia District
- Savannah District
- Mobile District
- Little Rock District
- Rock Island District
- Los Angeles District
- New York District
- Jacksonville District
- New Orleans District
- Vicksburg District
- Tulsa District
- Portland District

Railroads

- Association of American Railroads
- CSX
- Milwaukee
- Terminal Railroad Alabama State Docks
- Burlington Northern Santa Fe
- Canadian Pacific
- New Orleans Public Belt
- Southern Pacific

Shippers

- Cargill
- Global Forestry Management Group

State Agencies

- Louisiana Transportation Research Center
- Louisiana Department of Transportation and Development
- Oklahoma Waterways Users Board

- North Carolina Department of Transportation

Federal Agencies

- Federal Highway Administration
- Maritime Administration
- General Services Administration

Financial Institutions

- World Bank
- US AID Bank

Representative Studies

Cost-Benefit Analysis

- **Economic Development Highway Corridors in Alabama.** Project manager of highway corridor studies for US 43, Tuscaloosa to Mobile and US 80 between Mississippi and Georgia boundaries. Responsible for development of scopes of work and supervision of subcontractor studies for US 43, Tuscaloosa to Eutaw, AL, and US 80 studies related to development of industrial parks or tourism centers in Demopolis, Selma, Montgomery and Tuskegee and measurement of rural quality of life in the corridor near Tuskegee to GA line. Has primary responsibility for analysis of US 43 corridor connecting Interstate Highways 20/59 near Tuscaloosa and I-10 near Mobile with regard to intermodal developments at Port of Mobile (containers and cruise sector), expansion of forest product industry, improved access to AL auto corridor, and promotion of tourism.

- **Access to Freight Terminals: An Intermodal Transportation Planning Framework for Needs Assessment and Planning.** Provided a framework for a State DOT to evaluate the private and social costs of access improvements to intermodal freight terminals. The study objective was to develop an analytical framework to assist policy making wherein existing modal funding programs could define the social benefits to the State from public investment in intermodal infrastructure such as port access roads which otherwise would not likely be funded by individual modal programs. Unlike traditional benefit cost applications the study provided both methodologies and examples for the valuation of public sector social and environmental costs occasioned by transportation.

- **Multiport Competition Study of Baltimore Harbor and the C&D Canal—Philadelphia District U.S. Army Corps of Engineers.** Determined the total freight costs of containerized cargoes to and from thirteen states via ports of New York, Norfolk, and Baltimore for major vessel deployment patterns and world trade area. The study objective was to define cargo volumes and hinterlands for which the Port of Baltimore in general had a competitive advantage and determine the contribution of improvements to the C&D Canal to the Port's competitive advantage to justify harbor improvements.

- **Port of Panama City, FL: Benefits of Channel Deepening.** Determined economic benefits from larger or more fully loaded vessels as a result of deepening the navigation channel to Port of Panama City for different depths, vessel fleet sizes and commodities. Developed alternative costs of land and inland waterway movements to and from other ports such as Mobile.

- **Economic Analysis of Benefits for Deepening of Alafia River, Tampa Bay, Florida—Cargill Fertilizer.** Prepared economic benefits for Corps of Engineers on behalf of Cargill for deepening of Alafia River for Handsize vessels (<50,000 dwt) and Panamax vessels (>50,000) dwt. Study involved possible consolidation of multiple local terminals affecting ammonia vessels (as well as developing particular operating costs of specialized LPG vessels for this trade) in addition to substitution of dry sulfur imports for existing liquid sulfur shipments. Study was complicated by non-competitive pricing practices of different terminals that had to be adjusted to eliminate economic rents and transfer payments as opposed to resource savings under Corps of Engineers National Economic Development (NED) benefits criteria as well as reflect prevailing "top-off" practices of existing draft constrained vessels that tend to reduce the benefits from deepening an otherwise shallow navigation channel. Because of the nature of the commodities and associated vessels it was necessary to have three models of phosphate exports, ammonia imports, and dry sulfur imports to arrive at different benefits based on project depth, fleet size, terminal consolidation, and cargo flows.

- **Economic Analysis of Benefits to the Maryland Port Administration from Improvements to the C&D Canal—Philadelphia District U.S. Army Corps of Engineers.** Executed series of scopes of work for a Pre-construction Engineering Design (PED) study of the national economic development benefits of navigation improvements to the C&D Canal. The work included the full component of economic benefits based on vessel fleet forecasts, commodity forecasts, defining baseline and future with and without project conditions, applications of vessel costs and related pilotage fees to define savings for vessels using the C&D Canal as an alternative to Chesapeake Bay when sailing between Baltimore and other North Atlantic ports. The work also included vessel queuing and traffic delays from restricted two-way passages (beam-conflicts). Defined benefits for different project depths and vessel fleets, as well as multiport and lost tonnage benefits for the Port of Baltimore.

- **Benefits to the Maryland Port Administration (MPA) for Improvements to the C&D Canal—Maryland Port Administration.** Served as technical advisor to MPA to prescribe economic benefits for deepening the C&D Canal. Responsible for questionnaire development and field interviews with senior vessel operations staff to determine vessel use of the C&D Canal as an alternative to Chesapeake Bay. Analyzed vessel arrivals and departures and identified savings in vessel schedule time as well as stevedoring costs based on ILA overtime rates and work rules. Developed historical time series of vessel utilization of C&D Canal as a feasible alternative to Chesapeake Bay route between North Atlantic coast ports and Baltimore.

- **New York New Jersey Harbor Dredging Scenario Study—Port Authority of New York and New Jersey.** Determined cost impacts on vessel fleet and marine cargoes from failure to dredge and potential negative impacts on use and size of vessel fleets calling New York Harbor for a series of

alternative harbor depths. Study determined the likely range of shallower depths at which point cargoes would be diverted from New York to alternative ports as a key input to regional input-output economic impact analysis.

- **Parana-Paraguay (Hidrovia) River Network Analysis Study.** Determined tow and barge operations and costs and associated benefits for alternative river improvements related to size of tows, channel depth during seasonal fluctuations of water levels, and reaches of the river served by commercial navigation. Defined intermodal alternatives for cargoes such as truck or rail costs, including pending extension of new rail capacity into navigation hinterland. Determined project benefits and costs for different rail and intermodal development alternatives.

- **Two-Canals Study, Egypt (El Dikheila-Nobaria Canal and Ismailia Canal).** Defined tow and barge fleet sizes, capacities, operations, and costs and integrated commodity projections into a mode split model that would determine economic benefits to a developing country for inland waterway improvements. Determined intermodal alternatives such as railway block train operations and associated financial (private) and economic (social) costs.

- **An Empirical Analysis of Estimating Vessel Tonnages Using Immersion Factor Formulae and the Relationship of Cargo Tonnage to Vessel Deadweight—Institute for Water Resources.** Determined the accuracy of different immersion (tons per inch of vessel hull displacement) formulae with regard to predicting vessel cargo tonnage compared to actual manifest tonnages reported. The study distinguished between different types of vessels as well as vessel sizes to determine the "goodness of fit" between actual reported cargo tons and estimated cargo tons based on immersion formulae.

- **Baseline Data on U.S. and Foreign Ports by Major Trade Routes—Institute for Water Resources.** Determined the feasibility of merging databases for cargo flows and vessel port calls that could be sorted to include various ports and world regions to define port-to-port cargo flows and associated vessel characteristics. Pilot study involved more than 40,000 vessel manifest records of U.S. imports and exports for which vessel sailing characteristics (draft) were linked to harbors and commodities as part of an input to a national dredging requirements study.

- **St. Lucie Inlet, Florida Deepening Benefits Analysis—Jacksonville District Corps of Engineers.** Developed spreadsheet model of small commercial fishing and charter boat vessel operating expenses, sailing drafts, and delays under different navigation channel depths at St. Lucie Inlet. Vessel costs and fishing revenues were defined for different fleets and seasonal operations. Model determined national economic development benefits, including recreation, in conformity with Corps of Engineers guidelines.

- **Hillsborough Inlet Florida Deepening Benefits Analysis—Jacksonville District Corps of Engineers.** Developed spreadsheet model of commercial fishing vessels, sailing drafts, and delays under different navigation depths at Hillsborough Inlet. Model determined national economic development benefits in conformity with Corps of Engineers guidelines.

- **Raritan Bay Anchorages Study.** Determined vessel fleet costs and resulting savings from reductions in delay associated with increased anchorage for lightering and other purposes primarily associated with tanker vessels calling New York Harbor.

- **Indus River Pakistan Navigation Feasibility Study.** Developed tow and barge fleet size capacity and operational characteristics, including capital and operating expenses in conjunction with different improvements to the Indus River affecting waterway navigation characteristics. Developed bulk commodity flows from analysis of Pakistan Railways cargo flows, which were assigned to rail or waterway by least total cost analysis based on railway, vessel and trucking costs. Railway costs reflected existing state ownership and operation of Pakistan Railways (PK) as well as possible commercialization of distinct services (block trains) or privatization scenarios for freight operations and infrastructure. Water costs based on tow and barge sizes for different channel and lock sizes with and without user fees for infrastructure maintenance and operations and capital costs. Developed private and public sector benefits of commercial navigation for different investment scenarios, including seasonal low water flow disruptions of commercial navigation and potential railway efficiencies induced by commercialization or privatization.

- **Cost Optimization Equilibrium Model for Predicting Vessel Size Response to Changes in Channel Geometry—Institute for Water Resources.** Developed algorithm that would reassign vessels to different ports based on the most efficient usage of vessel fleet capacity for a predefined population of cargoes defined by commodity tons and destination port characteristics. Model allowed for deployment alternatives to Panama Canal and Suez Canals such as Capesize and ULCC crude carriers. Computed voyage costs for each shipment and total costs for each port based on channel deepening developments within a range of competing ports.

- **Montgomery Point Lock and Dam Feasibility Analysis.** Updated a previous benefit cost analysis of different categories of benefits to users of the White River affected by low water restrictions and channel closures. Shipper benefits redefined for logistics (inventory stockpiles), lost sales, and emergency use of alternative modes.

- **National Economic Development Procedures Manual: Deep Draft Navigation—Institute for Water Resources.** Lead co-author of a Corps of Engineers manual designed to show planners and transportation specialists how to perform National Economic Development (NED) benefit cost analysis for deep draft channel and harbors. Procedures manual is recognized within the Corps as the authoritative basis for deep draft economic analysis. Published as *National Economic Development Procedures Manual – Deep Draft Navigation*, IWR Report 91-R-13, November 1991, 240 pages.

- **Georgia Harbor Imported Vehicle Multiport Study—Savannah District Corps of Engineers.** Determined the potential for Brunswick Harbor to become a major point of entry for imported vehicles, shifting commerce away from other ports, particularly Jacksonville. Developed a least total cost model for vessel, port processing, and hinterland rail and truck shipments of imported Asian and European vehicles to 39 major consumption points in continental U.S. to define the competitive

hinterland for South Atlantic ports. Conducted sensitivity analysis to determine the likely range of Brunswick Harbor participation in the South Atlantic imported vehicle market.

Financial Analysis

- **North Carolina Statewide Transportation Multimodal Plan Update: Analyze and Evaluate Alternative Financing Options.** Responsible for baseline financial forecasting for existing funding sources, assessment of adequacy of available revenues, and evaluation and analysis of alternative sources of funds.
- **Development of Privatization Plan for Costa Rica National Ports.** Developed series of financial analysis of different marine terminals and tug fleets to be privatized under lease or concession agreements. Integrated vessel fleet forecasts with commodity forecasts to arrive at vessel calls and then incorporated existing port and marine terminal tariffs to define revenue flows for prospective operators. Developed capital and operating costs for different facilities based on capacity and asset turnover. Analysis included tug fleet operations at both Atlantic and Pacific coasts and bulk cargo and cruise (passenger) vessel facilities at these coasts. Developed annual cash flows and investment requirements for 20 years for each facility. Made privatization recommendations based on minimum concession and lease payments to government and estimated financial returns to operators, including possible tariff adjustments.
- **Development of Corporate Plan and Corporatization of Dredging and Engineering Services, Karachi Port Trust, Pakistan.** Performed detailed financial and productivity analysis of the existing dredging fleet vessels and related support services to determine the costs and productivity of a privatized fleet. Developed vessel crew operating requirements and future capital investments for the existing fleet. Determined the average total cost per cubic meter of annual maintenance dredging under different investment and operating scenarios. For the entire Karachi Port Trust (KPT) performed a financial analysis of major lines of business to determine past profitability and project future cash flows under existing organizational structure. Determined the changes in annual and discounted cash flows (twenty years) for various levels of privatization, as well as landlord versus operating port organizational structures.
- **Second Inland Waterways Project: Inland Water Transport Sector Development Strategy in China.** Developed a cash flow model of major Provincial Inland Waterways Agency responsible for inland waterway construction, operations, and maintenance to determine the impacts of different user fees and waterway capital investments for modernization of the barge fleet and agency cash flows. Integrated a barge fleet forecast with vessel replacement strategies to examine the impacts of larger more efficient barges on the competitiveness of the inland waterways sector (savings to shippers). Developed strategies for governments to encourage construction of larger more efficient barges and that would allow for higher waterway fees to be charged and augment existing cash flows for modernization of the system.

- **Port Organization, Management and Financial Performance: Technical Assistance to Russia's Port Sector Reform with Port Arkhangelsk as a Model.** Converted the existing Russian accounting system chart of accounts into a "western" format to determine profitability of different port enterprises and activities. Developed western income and cash flow statements to capture changes in tariffs and privatization of different services performed by port subsidiary enterprises. Developed strategic recommendations for business restructuring to avoid or minimize effects of projected bankruptcy of parent port enterprise without restructuring work force and consolidation of redundant facilities.

- **TDA Feasibility Study: Component VII Transportation (Rail and Port) Infrastructure for the Export of Logs by Rail from Siberia to Sovetskaya Gavan Harbor.** Assessed efficiency and capacity bottlenecks of existing and proposed railway and port operations and required investments for the exportation of logs from different sources in Siberia. Prepared income and cash flow statements for different port investments and throughput capacities. Developed model of berth, storage yard, and rail unloading capacity requirements to define existing and future bottlenecks up to a maximum annual throughput volume of 1.2 million metric tons of logs.

- **Ports Development Strategy for Southern Sumatra and Western Java Region of Indonesia—Pelindo II Region.** Performed a financial analysis of 13 ports, including major port of Tanjung Priok (Jakarta), to document existing and project future financial performance and cash flows, including dividend payments to central government. Prepared future net cash flow analysis of the ports based on vessel and cargo projections, existing and future tariffs, and future investments required to increase capacity, including rehabilitation. Determined cash flow benefits to national government from privatization of different ports, tariff modifications, and concession or sale of port infrastructure and assets. Recommended privatization of container terminals at Tanjung Priok.

- **Financial Analysis of Privatization of Krakatau Steel Port Facilities at Cicading, Indonesia.** Developed cargo and vessel fleet forecasts and subsequent integration into a financial statement format to embrace port tariffs and marine terminal operating expenses for different cargoes such as scrap steel, iron ore, grain, cement, and containers. Analyzed different terminal development plans that reflected combinations of cargoes with distinct handling and storage requirements as well as time staging of development. Recommended development and postponement of certain investments and related facilities.

- **New Orleans Public Belt (NOPB) Railroad Financial Analysis and Revenue Expense Model.** Developed a revenue expense model that replicated past freight operating revenues and associated expenses for the NOPB and allowed user to define changes in revenue based on service volumes (carloads) or associated tariffs. Operating expenses for major activities such as train service or track maintenance could be changed based on different regression equations and estimates of variable and fixed expenses. Model allowed NOPB management to simulate alternatives to decreasing revenues and increasing costs that were plaguing the carrier.

- **Maritime System of the Americas Study: Intermodal Operation of Ocean Going Vessels and Feasibility of Short Sea Vessel Operation.** Developed rail cost and service profile for intermodal service from Veracruz to Mexico City, including competition with overland U.S. and Mexican railroad network through Laredo. Study included assumptions about future cost structure and efficiency of expected privatization of nationalized Mexican rail system.

- **Maritime System of the Americas Study: River/Ocean Operations.** Developed vessel capital and operating costs, including transit times, for hybrid "river ocean" vessels that would serve overseas Mexican ports and domestic inland river ports on the Mississippi River System such as Pittsburgh and St. Louis in competition with rail and ocean vessels to Mexican markets. Developed U.S. and Mexican rail carload and unit train costs and defined competitive hinterland markets for river/ocean vessels based on domestic and foreign truck distances to and from ports. Identified geographic markets in U.S. and Mexico where river/ocean vessels could be competitive with existing modes of transportation, including rail and rail ocean intermodal alternatives for different commodities.

Logistics and Transport Operations

- **FHWA Benefit/Cost Analysis Study.** Developed case studies of shipper logistics cost savings from inventory reduction and warehouse consolidation as well as truckload carrier and shipper interviews to elucidate responses to highway improvements that affect transit time and reliability. The objective of the study was to develop a methodology for determining shipper logistics cost savings based on highway improvements that result in inventory reductions as a refinement to the theoretical benefits of highway improvements.

- **Southwest Arkansas Navigation Studies—Extension of the Red River Waterway on Economic Development.** Determined poultry expansion induced by freight cost saving for feed receipts from expansion of commercial navigation on the Red River. Documented poultry production in counties and regions for Arkansas and Texas adjacent to proposed waterway expansion from Shreveport to near Texarkana. Forecasted poultry annual production for Arkansas and Texas counties and associated broiler feed consumption. Determined producer freight cost savings for feed by barge and related changes in production costs and average total costs (production and processing). Interviewed producers and processors to determine sensitivity to feed savings and production cost changes.

- **Truck Incentive Toll Pricing Study—Port Authority of New York and New Jersey (PANYNJ).** Developed questionnaire and a sample of peak hour commercial vehicle operators stratified by truck size and service (for-hire, private, drayage, etc.) to determine toll sensitivity in response to peak and off-peak pricing or infrastructure incentives for Port Authority bridges and tunnels. Interviewed stratified sample of commercial truck operators to determine sensitivity to toll incentives. Made recommendations to PANYNJ with regard to tolls incentives for trucks.

- **Future Port Warehouse Requirements Study—Port Authority of New York and New Jersey.** Determined future demand for public warehousing space within the port district at Port Newark/Port Elizabeth as well as possible competitive impacts on cargoes handled by port warehousing that may

have to be shifted to off-port locations because of space constraints. Conducted public warehouse interviews in the port district and off port to define the market segments and competitive impacts of distance from the port in terms of cost of drayage and time. Developed estimated cargo volumes of imports handled by public warehouse sector on and off port. Recommended future space requirements based on cargo projections and assumptions about institutional constraints such as handling heavy (overweight) containers off port via a flexible truck overweight permit system.

- **Assessment of New Market Opportunities for the McClellan-Kerr Waterway—Tulsa District Army Corps of Engineers and Oklahoma Waterway Users Board.** Determined major new bulk commodities originating or terminating in a 13-state hinterland that could be served alternatively by the waterway. Identified all major rail bulk cargo flows from non-public use (complete and confidential) carload waybill samples and developed origin destination flows for rail and truck waterway alternatives. Developed rail average variable movement costs (Uniform Rail Cost System) and made mark up adjustments to reflect different competitive pricing conditions from "waterway compelled rates" to "market dominant" rates. Developed alternative truck and waterway rates, including all port related costs, and identified possible waterway market opportunities under different rail pricing scenarios. Recommended waterway development initiatives to attract up to as much as 300,000 to 400,000 tons of new cargo annually.

- **Federal Supply Center Depot Belle Mead, New Jersey: Market Feasibility and Site Suitability.** Determined alternative industrial uses of brownfield site of former government supply depot that represented the largest contiguous ready-to-develop site with existing direct rail access in the northeast U.S. Developed a profile of using the Belle Mead site for domestic distribution of automobiles based on proximity to railroad mainlines and shortages of suitable space in Northeast. Forecasted the annual number of vehicles the site could competitively handle compared to existing sites serving the local New York market.

- **Port Competitiveness Analysis for the Sociedad Portuaria Regional de Cartagena, Colombia.** Compared truck highway distances, driving times with estimated truck operating costs, and tariffs to define the degree to which price discrimination may exist for the Port of Cartagena for hinterland movements of marine containers in competition with other eastern Colombian ports (Santa Marta and Barranquilla). Analysis included different rates of backhaul. Determined that truck rates were distinctly higher for Cartagena compared to other ports from common hinterland distances and routes. Study was used by port operator to negotiate with local trucking companies and pricing consortium.

- **Louisiana Statewide Freight Intermodal Plan: Ports, Railways and Freight Intermodal Terminals.** Defined capacity and utilization of port and rail intermodal local access roads, generally defined from the perspective of nearest limited access roadway. Involved visual inspection of rail port connections and documentation of rail institutional restrictions such as lack of reciprocal switching or prohibitive switching charges for competitive traffic limiting port competition. Made recommendations about rail port private switching operations where feasible.

- **Canadian Pacific (CP) Railroad Inland Waterways Study.** Developed a series of commodity based spreadsheet models of major inland waterway flows of grain, coal, and chemicals to support CP Rail's strategic planning for possible intermodal competition or cooperation with river ports and barge operators. Proprietary barge costing models reflected detailed river operations for tow speeds, fuel consumption, and equipment utilization. Backhaul assumptions allowed the model to determine the impacts on average total cost and equipment cycle times.

- **1991 Deep Draft Vessel Operating Costs—U.S. Army Corps of Engineers.** Surveyed deep draft vessel fleet operators around the world to collect proprietary data on vessel operating costs, including some data purchased from fleet operators. Performed statistical analysis of vessel operating costs and time series of vessel new building costs. Analyzed fuel consumption and costs. Prepared detailed vessel operating cost profiles for Corps of Engineers to use to determine harbor improvement benefits for larger or more fully loaded vessels. Made recommendations to Corps about robustness of vessel cost statistics and future data collection.

- **1990 Shallow Draft Vessel Operating Costs—U.S. Army Corps of Engineers.** Expanded earlier surveys of barge fleet operators done in 1982, 1986, and 1988 to include statistics on equipment utilization relative to loaded, empty, idle repairs, idle other, etc. Developed towboat and barge capital and operating costs, which are used by the Corps to determine economic benefits from river improvements.

- **Burlington Northern (BN) Railroad Mississippi River System Barge Cost Model.** Developed spreadsheet barge cost model for grain, coal, and chemicals for major markets served by BN susceptible to inland waterway competition.

- **Montgomery Point Lock and Dam Feasibility Analysis.** Conducted shipper interviews to identify logistics costs associated with disrupted barge movements due to low water levels near entrance of White River to Mississippi River.

- **Terminal Railroad of Alabama State Docks Efficiency and Organizational Study—Port of Mobile.** Conducted efficiency assessment and evaluated different operational and organizational alternatives (privatization) for public sector terminal switching railroad. Based on field observations (train riding) and other data, developed standardized engine and crew switching times for approximately 30 distinct industrial locations and switching operations served by port terminal railroad. Average total switching times for all movements and industries were related to tariffs to determine the operating profitability of continuing service to different industries and segments of the railway with scenarios for divesting of different parts of the railway to improve total cash flows. Various restructuring scenarios were performed including crew reductions and labor cost reductions through potential sale or lease of the railway to a non-union operator. Study was used by Alabama State Docks as a blueprint to hire new management and turn the railway around from a loss leader to significant profit center of the port with respect to earnings.

Commodity Projections and Vessel Fleet Forecasts

- **Long Term Demand for U.S. Exports of Soda Ash in Conjunction with Rail Freight Rate Reductions.** Interviewed major Wyoming-based U.S. producers of soda ash and prepared proprietary projection of future overseas export sales for the period 2001 through 2007 in conjunction with projected rail freight rate reductions. Developed export projections for major world areas for U.S producers in conjunction with overseas production and non-U. S imports.
- **Commodity and Vessel Fleet Projections for San Diego Harbor.** Developed soda ash and other bulk commodity projections for San Diego Harbor and vessel fleet trends in response to possible deepening.
- **Commodity Projections for Baltimore Harbor—Philadelphia District Corps of Engineers.** Developed world area commodity projections for Baltimore Harbor imports and exports by cargo and type of vessel. The commodity projections were reconciled with similar projections for other Atlantic coast ports such as New York and Savannah.
- **Fort Pierce Harbor, Florida Commodity and Vessel Fleet Projections—Jacksonville District, Corps of Engineers.** Developed commodity fleet projections for bulk imports and citrus (grapefruit) exports. Citrus production was developed from tree population inventories, new plantings and cultivations, and productivity to determine future citrus production in Florida counties served by the port. Port share of citrus exports was based on assignment of citrus crop to packing houses and least total cost assignment between packing houses and ports on east and west coasts of Florida.
- **Coos Bay Oregon Harbor Commodity and Vessel Fleet Projections.** Developed different scenarios of "old growth" timber inventories and related harvest restrictions to arrive at alternative sources of lumber for export from Coos Bay, Oregon.
- **Port Canaveral Harbor, Florida Commodity and Vessel Fleet Projections.** Developed bulk commodity projections and future vessel fleet characteristics for cement imports and scrap exports.

Capacity Utilization Assessments

- **Dynamic Simulation of Ports and Intermodal Systems Rapid Responses to Emergency Disruption: Development of a Methodology to Measure Port Local Access Road Capacity Constraints and Disruptions.** Developed literature review, data requirements, and conceptual model for determining local port gate access constraints for existing local street and road system between nearest limited access highway and marine terminal gates.
- **Dynamic Simulation of Ports and Intermodal Systems Rapid Responses to Emergency Disruption: Port Terminal Allocation within a Single Port (Phase 2) and Multi-Port Allocation (Phase 3) Within a Coastal Range.** Developed simulation model (Visual Basic) that allows user to define any kind of port, terminal, cargo, or vessel and determine berth occupancy, yard occupancy, and gate utilization. Model allows user to change throughputs (vessel and cargo flows) or facilities

(removal from commercial use for military mobilization purposes) to determine the impact of capacity utilization for commercial cargo flows. Model can be used in deterministic or stochastic setting for vessel arrivals and departures and volume of cargo flows.

- **Dynamic Simulation of Ports and Intermodal Systems Rapid Responses to Emergency Disruption: Phase 1, Literature Review and Scoping of Research.** Determined port industry desired refinements to existing spreadsheet model of marine terminal capacity and throughput to allow for stochastic non-linear inputs as well as non-containerized cargoes. Interviewed marine terminal operators at major container ports to prospectively determine data requirements and availability.

- **Response Model to Disruption of Maritime Transportation Systems.** Assessed port and military interests in determining capacity constraints induced by emergency military mobilization such as occurred during Desert Storm. Developed detailed capacity throughput models for Jacksonville, Savannah, and Oakland marine container terminals and desktop versions for container terminals at ten other major ports for a total of more than 35 marine terminals at Major U.S. container ports. Capacity utilization was based on actual vessel call and cargo flows, in conjunction with reported yard parking and stacking configurations and container dwell times. Spreadsheet model determined marine terminals daily capacity utilization and alternatives to increase capacity such as grounding, higher stacking, removal of empty containers, and shortening dwell times. Study represented a major refinement to port throughput capacity by including dwell time and integrating yard occupancy with marine gate weekend hours of operation.

- **System Operation Review: Navigation Impacts of Alternative Salmon Mitigation Strategies on the Columbia-Snake River Commercial Navigation.** Identified additional freight costs and possible capacity constraints associated with different degrees and durations of proposed drawdowns of water levels of the Columbia-Snake River pools in conjunction with different salmon mitigation plans. A four-state spreadsheet model was developed that defined existing barge commodity flows to and from the river, primarily grain but also other bulk commodities. The shipments were defined for each month for interior grain elevators and river port facilities. Alternative routes were developed in response to drawdowns. The model reacted to capacity constraints by reallocating diverted flows and/or defining new capacity, primarily rail cars. The total costs of the system with and without drawdowns were compiled by commodity and state. The model allowed the Corps of Engineers to assess the costs and economic impacts of disruptions to commercial navigation from drawdowns. The results of the model were that drawdowns for comparatively short periods of time, not exceeding three months, could be tolerated other than at peak periods of grain shipping.

Background

Before joining AECOM, Dr. Horn performed consulting engagements for Louis Berger Group as Senior Intermodal Analyst and was a Research Professor in the LSU National Ports and Waterways Institute. Dr. Horn was a Professor of Transportation and Logistics and designated as CSX Fellow of Transportation at

the University of North Florida. He has held positions at the Association of American Railroads and Interstate Commerce Commission. He was employed in the Operating and Engineering Maintenance of Way Departments of the Norfolk and Western Railway.

Professional Affiliations

Dr. Horn is a member of the Transportation Research Forum.

Education

Ph.D., Business Logistics, The Pennsylvania State University, 1976

M.B.A., Indiana University, Bloomington, Indiana, 1971

B.S., Business, Indiana University, Bloomington, Indiana, 1969

Publications

Dr. Horn is the author of more than 30 refereed articles and reports in addition to serving as editorial board member of Transport Reviews and Journal of the Transportation Research Forum

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